BUREAU OF WATER

South Carolina Department of Health and Environmental Control

SHELLFISH MANAGEMENT AREA 12B

2003 ANNUAL UPDATE

Shellfish Sanitation Program

Water Monitoring, Assessment and Protection Division
Environmental Quality Control - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

July 2003

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South Carolina Department of Health and Environmental Control

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2003 ANNUAL UPDATE

[Data Thru December 2002]

Shellfish Management Area 12B
Shellfish Sanitation Program

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Data Inclusive Dates:
01 / 01 / 00 thru 12 / 31 / 02

Classification Change:
X Yes ___ No

Shoreline Survey Completed: Yes

Prior Report & Date: Annual -2002

(I)ncreased/(D)ecreased/(N)one:

I	Approved
N	Cond. Approved
D	Restricted
N	Prohibited

SUMMARY

For this 3-year review period, 18 of the 23 classified stations exhibited slightly lower fecal coliform geometric mean and/or estimated 90th percentile MPN values than in the previous 3-year review period. Although the upland shoreline has little development directly along the marsh, this area does have a significant number of documented animal farms close to area creeks. Livestock populations in close proximity to shellfish growing waters may contribute to lower water quality. Russell Creek, as well as a small area in the lower portion of Toogoodoo Creek (portions of S-168 & M-168), will be upgraded to an Approved classification. These areas will be closely monitored for water quality oscillations.

INTRODUCTION

PURPOSE AND SCOPE

The authority to regulate the harvest, sanitation, processing and handling of shellfish is granted to the South Carolina Department of Health and Environmental Control by Section 44-1-140 of the Code of Laws of South Carolina, 1976, as amended. The Department promulgated Regulation 61-47 which provides the rules used to implement this authority and outlines the requirements applied in regulating shellfish sanitation in the State. This regulation specifically addresses classification of shellfish harvesting areas and requires that all areas be examined by sanitary and bacteriological surveys and classified into an appropriate shellfish harvesting classification.

The National Shellfish Sanitation Program (NSSP) Guide For The Control Of Molluscan Shellfish is used by the United States Food and Drug Administration (USFDA) to evaluate state shellfish sanitation programs. The NSSP Model Ordinance requires that a sanitary survey be in place for each growing area prior to its use as a source of shellfish for human consumption and prior to the area's classification as Approved, Conditionally Approved, Restricted, or Conditionally Restricted. Each sanitary survey

shall be updated on an annual basis and accurately reflect changes which have occurred within the area. Requirement of the annual reevaluation include, at a minimum, field observations of pollution sources, an analysis of water quality data consisting of the past year's data in combination with appropriate previously collected data, review of reports and effluent samples from pollution sources, and review of performance standards for discharges impacting the growing area. A brief report documenting the findings shall also be provided.

The following criteria consistent with the NSSP Model Ordinance and S. C. Regulation 61-47 are used in establishing shellfish harvesting classifications:

Approved - Growing areas shall be classified Approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations which would render shellfish unsafe for human consumption. The Approved area classification shall be designated based upon a sanitary survey which includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. For waters sampled under adverse pollution conditions, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN shall not exceed fourteen per one hundred milliliters, and not more than ten percent of the samples shall exceed a fecal coliform MPN of forty-three per one hundred milliliters (per five tube decimal dilution). For waters sampled under a systematic random sampling plan, the geometric mean fecal coliform Most Probable Number (MPN) shall not exceed fourteen per one hundred milliliters, and the estimated ninetieth percentile shall not exceed an MPN of forty three (per five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP Guidelines.

Conditionally Approved - Growing areas may be classified Conditionally Approved when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be adopted by the Department prior to classifying an area as Conditionally Approved. Where appropriate, the management plan for each Conditionally Approved area shall include performance standards for sources of controllable pollution, e.g., wastewater treatment and collection systems, evaluation of each source of pollution, and means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate.

Restricted - Growing areas shall be classified Restricted when sanitary survey data show a limited degree of pollution or the presence of deleterious or poisonous substances to a degree which may cause the water quality to fluctuate unpredictably or at such a frequency that a Conditionally Approved classification is not feasible. Shellfish may be harvested from areas classified as Restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision. For Restricted areas to be utilized as a source of shellstock for depuration, or as source water for depuration, the fecal coliform geometric mean MPN of restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more

than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Conditionally Restricted - Growing areas may be classified Conditionally Restricted when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department prior to classifying an area as Conditionally Restricted. Where appropriate, the management plan for each Conditionally Restricted area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and description of the means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish may be harvested from areas classified as Conditionally Restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision. For Conditionally Restricted areas to be utilized as a source of shellstock for depuration, the fecal coliform geometric mean MPN of Conditionally Restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Prohibited - Growing areas are classified Prohibited if there is no current sanitary survey or if the sanitary survey or monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area or indicate that such substances could potentially reach quantities which could render shellfish unfit or unsafe for human consumption.

BACKGROUND INFORMATION

This sanitary survey evaluates the current harvesting classification of shellfish growing waters designated as Shellfish Management Area 12B (Area 12B). Area 12B consists of approximately 31,125 acres of shellfish growing area habitat located in Charleston County, South Carolina. The area consists of the Dawho, North Edisto and Wadmalaw Rivers, Wadmalaw Sound along with Leadenwah, Ocella, Russell, Sand, Steamboat, Tom Point, Toogoodoo and Westbank Creeks and the Atlantic Intracoastal Waterway (AIWW). Area 12B is bounded to the east by Wadmalaw Island and to the north by State Roads 162 and 164. The western border is defined by State Road 174 and Edisto Island. The southern boundary is the Atlantic Ocean.

The harvesting classifications of Area 12B prior to this sanitary survey were as follows:

Prohibited: (Administrative closure)

1. Those waters extending 1000 feet from the Metal Trades repair facility in Wadmalaw River.

Restricted:

1. Those waters of Toogoodoo and Lower Toogoodoo Creeks and all adjacent marshland from their headwaters to station 44 on Toogoodoo Creek;
2. Those waters of Steamboat Creek and all adjacent marshland from Station 37 to Station 50;
3. Those waters of Whooping Island Creek and all adjacent marshland from Steamboat Creek to the west border of the area;
4. Those waters of Sand Creek and all adjacent marshland from its headwaters to Steamboat Creek;
5. Those waters of Russell Creek and all adjacent marshland from its headwaters to Steamboat Creek;
6. Those waters of Dawho River from its headwaters at the northwestern border of the area to station 5 at North Edisto River;
7. Those waters of Tom Point Creek from Station 30 to the headwaters.

Approved: All other waters in Area 12B.

The shellfish industry in South Carolina is based primarily on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams, which include both the northern clam (*Mercenaria mercenaria*) and several small populations of the southern clam (*Mercenaria campechiensis*). Areas in South Carolina designated for commercial harvest by the South Carolina Department of Natural Resources (SCDNR) include State shellfish grounds, culture permits, and Kings Grant areas. The ribbed mussel (*Geukensia demissa*) is also harvested in South Carolina. It is primarily gathered on a small scale by the general public for recreational harvest. The South Carolina Department of Health and Environmental Control will disallow the harvesting of shellfish within Area 12B, for direct marketing purposes, from the restricted waters listed below in the Recommendations.

There are three State Shellfish Grounds (S) within Area 12B. Most of S-161 falls within the Restricted waters of Russell, Sand and portions of Steamboat Creeks. Nearly all of S-168 is located within the Restricted waters of Toogoodoo and Tom Point Creeks. S-182 (Leadenwah Creek) is the only ground entirely in approved waters. There are four small Public shellfish grounds located in Leadenwah Creek. There are four culture and one mariculture permit leases throughout the area.

The shellfish harvesting season in South Carolina normally extends from mid-September through mid-May. The South Carolina Department of Natural Resources (SCDNR) has the authority to alter the shellfish harvesting season for resource management purposes and grant permits for year-round mariculture operations. Additionally, the South Carolina Department of Health and Environmental

Control has the authority to prohibit shellfish harvesting when necessary to ensure that shellfish harvested in South Carolina waters are safe for human consumption.

POLLUTION SOURCE SURVEY

CHANGES IN POLLUTION SOURCES

No "substantial" changes in pollution sources have occurred in Area 12B since the 2002 report.

SURVEY PROCEDURES

Shoreline surveys of Area 12B were conducted by the Trident District Shellfish Sanitation staff, by watercraft, vehicle and on foot, during the survey period and are ongoing. Extensive visual examinations of lands adjacent to the waters of Area 12B were conducted to determine potential sources of pollution entering shellfish growing waters.

POINT SOURCE POLLUTION

A. Municipal and Community Waste Treatment Facilities - There are no permitted wastewater facilities within Area 12B. The homes along the northern border of the area, near the Town of Hollywood, are served by Charleston CPW which discharges outside of the area. The closest waste treatment facilities are located in Area 11 near the southern portion of Bohicket Creek. The two waste treatment facilities in Area 11 have been issued land application permits. One is on Kiawah Island (ND0017361) and the other is on Seabrook Island (ND0063347).

B. Industrial Waste (Discharges) - There are no permitted industrial wastewater discharges located within the boundaries of Area 12B.

C. Marinas – S.C. Regulation 61-47, Shellfish defines *Marina* as "any water area with a structure (docks, basin, floating docks, etc.) which is: 1) used for docking or otherwise mooring vessels; and, 2) constructed to provide temporary or permanent docking space for more than ten boats, or has more than 200 linear feet of docking space." There are no recreational boat docking facilities or commercial fisheries docks located within this management area. One facility, Metal Trades on Yonges Island, performs large-scale repairs of barges and large boats while in a drydock. Minimal repairs occur when the boats are in the water. Refer to the current classification map for an outline of the administratively prohibited closure located in the Wadmalaw River, south of Wadmalaw Sound.

D. Radionuclides - Sources of radionuclides have not been identified within Area 12B, and radionuclide monitoring has not been conducted. No other sources of poisonous or deleterious substances have been identified within the area.

NONPOINT SOURCE POLLUTION

A. Urban and Suburban Stormwater Runoff - The shoreline survey conducted in Area 12B revealed the highest concentration of homes to be throughout the northern most portion of the area. Single family homes continue to be built along almost every water body within the area. Land clearing, associated with this new construction, can accelerate shoreline erosion. Stormwater runoff impacts water quality by transporting fecal coliform bacteria from land to the shellfish growing area.

There are approximately three stormwater permits that have been issued within Area 12B. The permits are distributed throughout the area and have been primarily issued to housing subdivisions. The remaining permits are for stormwater control for schools and churches. These areas are depicted on the attached Potential Pollution Source map. The Army Corps of Engineers did not conduct any dredge projects during this past survey period.

The uplands surrounding the shellfish growing waters of Area 12B consist of various soil textures. These have been defined by the United States Department of Agriculture (USDA), Soil Conservation Service (1971) utilizing general classifications and descriptions. Although lands within the area consist of numerous soil types, the area north of the Dawho and Wadmalaw Rivers and Wadmalaw Sound is generally comprised of Yonges-Hockley-Edisto soils, and occur on a low, broad plain and contain randomly spaced drainageways that lead to tidal streams. The area south of the Dawho and Wadmalaw Rivers and Wadmalaw Sound is generally comprised of Kiawah-Seabrook-Dawhoo soils, and occur on low, broad ridges and long, narrow-to-broad depressions in areas roughly parallel with the coastline. The USDA (1971) further describes these soils similarly as "moderately well drained to very poorly drained, nearly level to depressional, sandy soils."

B. Agricultural Runoff - There are no permitted agricultural facilities located in Area 12B. However, during the shoreline survey, there were seven animal farms documented to be adjacent to both Tom Point and Toogoodoo Creeks. There are a multitude of single family homes with one to four horses located on each property. The Slann Island horse farm is located along the upper portion of the Dawho River near Station 53. The farm has recently been sold and is no longer in operation but has the potential to board anywhere from 150 to 300 animals if the new owner so desires. In addition, there are extensive agricultural crop farms within the area.

C. Individual Sewage Treatment and Disposal Systems - Nearly all homes adjacent to shellfish growing waters within Area 12B are served by individual septic systems. Nonpoint source pollution within the area is of major concern. It is difficult to locate these types of sources. No specific septic tank failures have been documented by the Division of Environmental Health (DEH). Each system is required to be inspected by the DEH, Trident Health District, and approved before final installation.

D. Wildlife and Domestic Animals - Area 12B supports a large population of domestic animals attributable to the number of private residences along the shores, including the documented animal farms. The area supports a moderate amount of wildlife; primarily various types of waterfowl and marine mammals. The area has an extensive network of small tidal creeks. This creek system provides a possible conduit for animal fecal coliform bacteria to be transported to the adjacent growing waters.

E. Boat Traffic - Recreational boat traffic is moderate in the area throughout the year. Commercial traffic in the AIWW is light and consists primarily of tugs and barges. Commercial fisheries boats, ranging in size from 16 to 50 feet, operate as long as the product demand exists. During the recreational shrimp-baiting season, typically extending from mid-September through mid-November, recreational traffic is heavy.

F. Hydrographic and Habitat Modification - Hydrographic and habitat modification in estuarine areas requires both State and Federal approval. Portions of the AIWW require maintenance dredging. The U.S. Army Corps of Engineers utilizes designated tracts of land adjacent to the AIWW as dredge spoil sites.

G. Marine Biotoxins - Bivalve shellfish contamination from marine biotoxins has not been shown to be a human health concern within Area 12B. The Department participates in a State Task Force on Toxic Algae and maintains a toxic algae emergency response team.

HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

PHYSIOGRAPHY

Area 12B currently consists of the waters of the Dawho, North Edisto and Wadmalaw Rivers, Wadmalaw Sound along with Leadenwah, Ocella, Russell, Sand, Steamboat, Tom Point, Toogoodoo and Westbank Creeks and the Atlantic Intracoastal Waterway (AIWW). The entire area is tidally influenced by the Atlantic Ocean through the North Edisto Inlet. The creeks within the area range from 30 to 700 feet in width and range from 2 to 45 feet in depth. The entire area is approximately 10 miles wide (west to east) and 14 miles long (north to south).

Tides - Tides in Area 12B are semidiurnal, consisting of two low and two high tides occurring each lunar day. Mean tidal ranges in the North Edisto River at Bluff Point are 5.5 feet during normal tides and 7.7 feet during spring tides. Wind direction and intensity, as well as atmospheric pressure, typically cause variations in predicted tidal ranges.

Rainfall - Precipitation in Area 12B is heaviest during late summer and early autumn. Tropical storms and hurricanes occasionally produce extremely large amounts of rainfall. During winter months heavy rainfall events are uncommon, yet occasional intense thunderstorms associated with rapidly moving low-pressure systems generate heavy rains. Precipitation rarely occurs in the form of snow or ice. Spring

weather patterns may be dynamic with associated thunderstorms and severe weather conditions.

The yearly average for a thirty-year period for rainfall in Charleston, recorded at the Charleston Airport, is 50.74 inches. The 2002 precipitation total recorded at the Edisto Beach State Park was 58.35 inches. The four months, July through October, had a total of 27.37 inches of rain. This was 47% of the total rainfall recorded for the year.

Winds - Prevailing winds along the central portion of the South Carolina coast are from the south and west during spring and summer and from the north during autumn and winter. Wind speeds are generally less than 15 miles per hour (mph); however, strong weather systems may generate winds in excess of 25 mph. Tropical storms and hurricanes occur occasionally.

River Discharges - Freshwater influence is primarily due to rainfall however, freshwater inflow into Area 12B enters through the Dawho River via the South Edisto River.

WATER QUALITY STUDIES

DESCRIPTION OF THE PROGRAM

The Department currently utilizes a systematic random sampling (SRS) strategy within Area 12B in lieu of sampling under adverse pollution conditions. In order to comply with NSSP guidelines, a minimum of thirty samples are required to be collected and analyzed from each station during the review period. Sampling dates are computer generated prior to the beginning of each quarterly period thereby insuring random selection with respect to tidal stage and weather. Day of week selection criteria is limited to Mondays, Tuesdays and Wednesdays due to shipping requirements and laboratory manpower constraints. Sample schedules are rarely altered.

During July 1998, an updated shellfish water quality data scheduling and collection procedure was formalized. Samples utilized for classification purposes are limited to those samples collected in accordance with the SRS for a 36-month period beginning January 1 and ending December 31. This allows for a maximum of 36 samples per station, yet provides a six-sample "cushion" (above the NSSP required 30 minimum) for broken sample bottles, lab error, breakdowns, etc. This also allows each annual reports water quality data to meet the requirements for the NSSP Triennial Review sampling criteria.

896 surface water quality samples (<1.0 ft. deep) were collected for bacteriological analysis from 25 active water quality sampling stations in Area 12B during the period 01/01/00 through 12/31/02. Of this total, 880 SRS samples were collected for classification purposes. The samples were collected in 120 ml amber glass bottles, immediately placed on ice and transported to the South Carolina Department of Health and Environmental Control's Trident District Environmental Quality Control laboratory at North Charleston, South Carolina. An additional 120 ml water sample was included with

each shipment as a temperature control. At the laboratory, sample sets exceeding a 30-hour holding time or containing a temperature control in excess of 10 degrees C. were discarded (APHA, 1970).

Surface water temperatures were measured utilizing hand-held, laboratory-quality calibrated centigrade thermometers. Salinity measurements were measured in the laboratory using an automatic temperature compensated refractometer. Additional field data include ambient air temperature, wind direction, tidal stage and date and time of sampling. Tidal stages were determined by using Nautical Software's *Tides & Currents,* Version 2 (1996).

MONITORING RESULTS

Stations 47 and 53 exceeded a fecal coliform geometric mean MPN value of 14. Stations 35, 47, 50, 52 and 53 exceeded a fecal coliform MPN estimated 90th percentile value of 43. No station exceeded a fecal coliform geometric mean MPN value of 88.

A fecal Coliform Bacteriological Data Summary Table is included in this report (See Table 2). The fecal coliform bacteriological raw data sheets with data collected between 01/01/00 and 12/31/02 are included following the data summary table.

CONCLUSIONS

Based on review of fecal coliform bacteriological data and the pollution source survey, Area 12B appears to be impacted primarily by non-point source pollution.

NONPOINT SOURCE RUNOFF

Stormwater runoff appears to be the major source of fecal coliform bacteria throughout the area. Wildlife and domestic animal populations likely contribute to poor water quality within the area. There are a large number of livestock farms located along the Toogoodoo and Tom Point Creeks and the Dawho River. The livestock have been noted directly on the shoreline and wading in the creeks, which feed these water bodies. A new station will be added in Tom Point Creek in order to provide data that should better assess water quality in the mid-reaches of the creek.

RECOMMENDATIONS

The shoreline survey and bacteriological data review of shellfish growing Area 12B indicate that the classification boundary descriptions should be modified. Station 34 has met approved area criteria in the 2 most recent 3-year review periods. Russell Creek, as well as a small area in the lower portion of Toogoodoo Creek (portions of S-168 & M-168), are recommended for upgrade to an Approved classification. These areas will be closely monitored for water quality oscillations. Although Station 45

met criteria for an Approved classification, due to an elevated 90th percentile value and the possibility of future oscillations, it is recommended to retain a Restricted classification. The recommended harvesting classification of Area 12B is:

Prohibited: (Administrative closure)

1. Those waters within 1000 feet of the Metal Trades repair facility in Wadmalaw River.

Restricted:

1. Those waters of Toogoodoo and Lower Toogoodoo Creeks and all adjacent marshland from their headwaters to Station 34 on Toogoodoo Creek;
2. Those waters of Steamboat Creek and all adjacent marshland from Station 37 to Station 50;
3. Those waters of Whooping Island Creek and all adjacent marshland from Steamboat Creek to the west border of the area;
4. Those waters of Sand Creek and all adjacent marshland from its headwaters to Steamboat Creek;
5. Those waters of Dawho River from its headwaters at the northwestern border of the area to station 5 at North Edisto River;
6. Those waters of Tom Point Creek from Station 30 to the headwaters.

Approved: All other waters in Area 12B.

Station Addition/Deactivation/Modification:

Added: Station 12B-54 (32-39-38.5, 80-17-55.9) Tom Point Creek, 3 bends upstream of Station 30.

Analysis of sampling data for Area 12B demonstrates the probability of a significant impact from rainfall exceeding 4.00" in a 24 hour period. Therefore, a precautionary closure of Area 12B will be implemented following rainfall events of greater than 4.00" in a 24 hour period, as measured at the Edisto Beach State Park located on Edisto Island. This methodology is associated with the concept of the Probable Maximum Precipitation (PMP). PMP estimates for the coastal United States has been published in a series of hydro-meteorological reports (HMRs) by the National Weather Service (*National Weather Service*). PMP estimates for South Carolina's growing areas are derived from HMRs 51, 52, and 53 (*National Research Council, 1985*).

REFERENCES

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National Weather Service. The National Oceanic and Atmospheric Administration. *Precipitation Frequency Atlas of the Western US: NOAA Atlas II*. Superintendent of Documents, US Government Printing Office - Washington DC.

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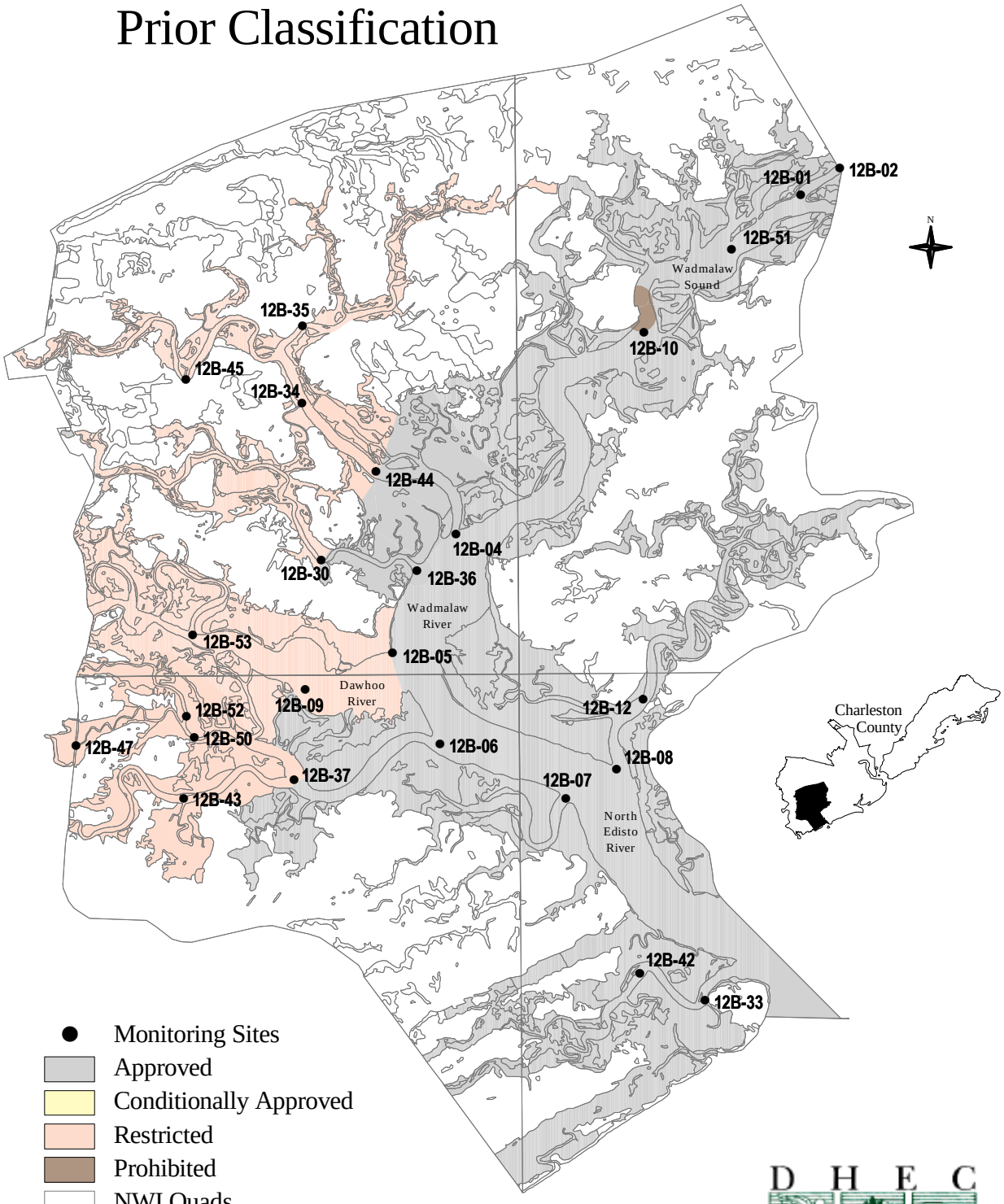
TABLE #1
Shellfish Management Area 12B
Water Quality Sampling Stations Description

Station	Description
01	Mouth of Church Creek, Marker #77
02	Goshen Point, Marker #69
04	Toogoodoo Creek at confluence with AIWW, Marker #102
05	Dawho Creek, Marker #110
06	Steamboat Creek, Marker #2
07	Westbank Creek at North Edisto River, opposite Leadenwah Creek
08	Leadenwah Creek at North Edisto River
09	Dawho River at Marker #119
10	South Boundary of Prohibited Area at Metal Trades Dock
12	Leadenwah Creek 1 mile from confluence of North Edisto River
30	Tom Point Creek at Park Island
33	Confluence of Ocella Creek and South Creek
34	Toogoodoo Creek SSG at last creek before fork
35	Public Boat Ramp, Lower Toogoodoo Creek
36	Confluence of Tom Point Creek and North Edisto River
37	Confluence of Steamboat Creek and Russell Creek
42	Headwaters of Ocella Creek
43	Russell Creek at estuary entering Sunbelt Clam Farms
44	Toogoodoo Creek midway between Stations 4 and 34
45	Toogoodoo Creek at second bend past the confluence with Lower Toogoodoo Creek
47	Sand Creek bridge at Highway 174
50	Sand Creek at intake to Westendorf Clam Farm
51	Wadmalaw Sound at day beacon #80
52	Confluence of Whooping Island Creek and Steamboat Creek
53	Dawho River at Marker #126
54	Tom Point Creek, 3 bends upstream of Station 30 **(NEW 01/04)**

(Total 26)

Figure 1.

Shellfish Management Area 12B
Prior Classification



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2003 Annual Report

Figure 2.

Shellfish Management Area 12B
Current Classification

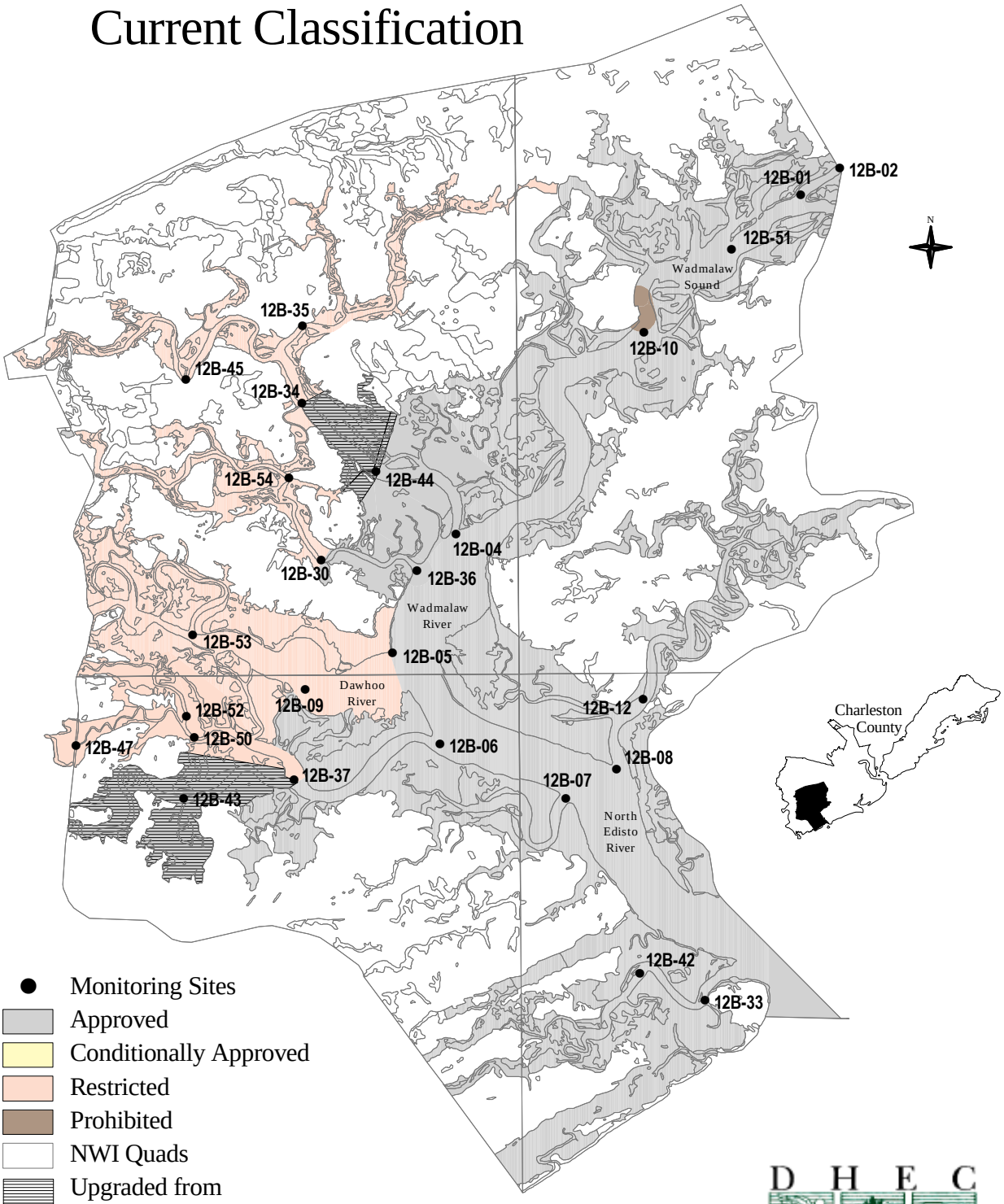

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Figure 3.

Shellfish Management Area 12B

Potential Pollution Sources

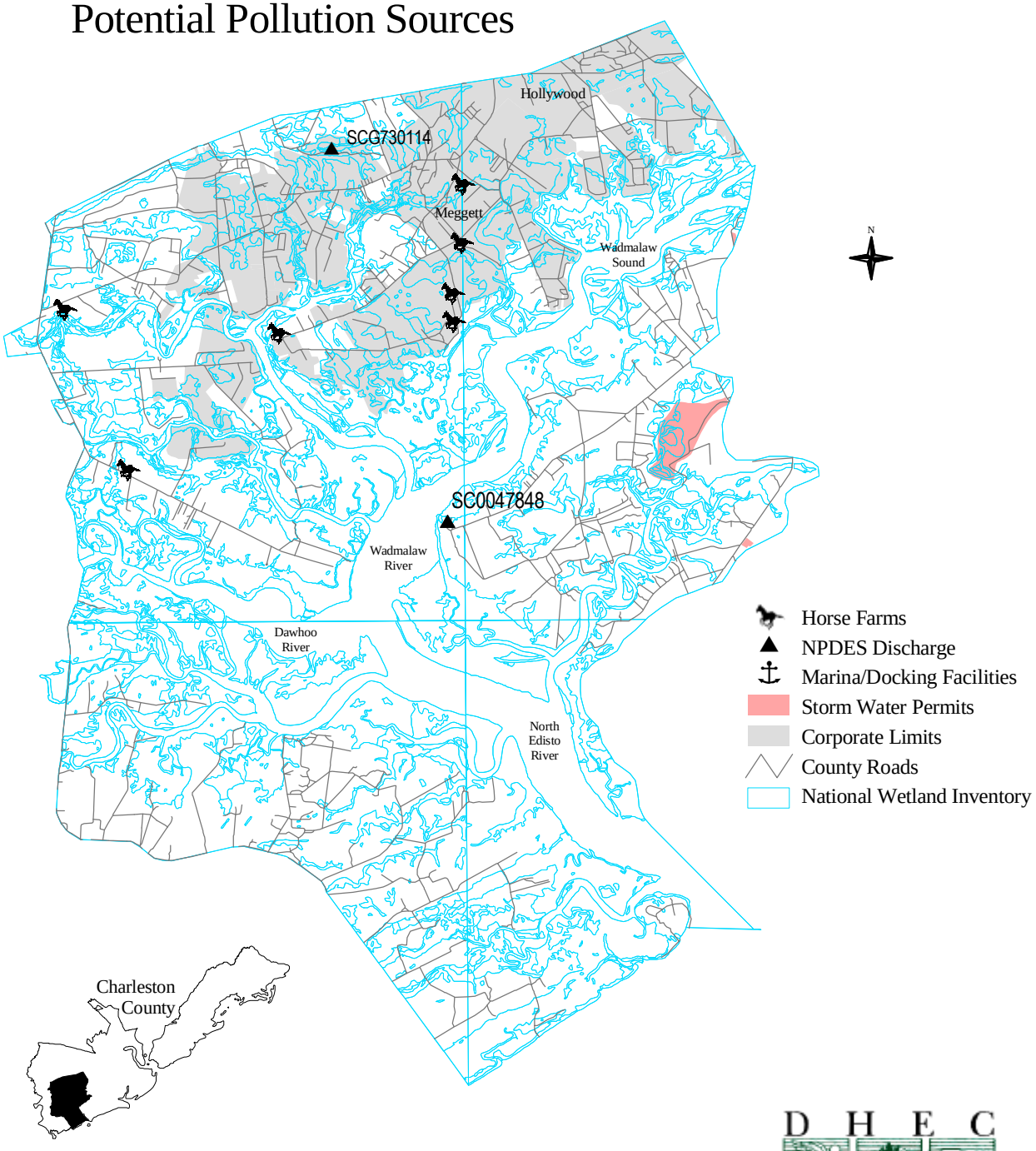

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TABLE #2

Shellfish Management Area 12B
FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
from Shellfish Water Quality Sampling Stations between

January 1, 2000 and December 31, 2002

Station #	1	2	4	5	6	7	8	9	10	12
SAMPLES	36	36	36	36	36	36	36	27	27	36
GEOMEAN	4.9	6.5	3.5	4.4	3.5	5.1	3.6	6.2	6.9	4.4
90TH %ILE	19	27	10	17	11	19	11	32	23	16
WATER QLTY	A	A	A	A	A	A	A	New	New	A
CLASSIFICATION	A	A	A	R	A	A	A	New	New	A

Station #	30	33	34	35	36	37	42	43	44	45
SAMPLES	36	36	36	36	36	36	36	35	36	36
GEOMEAN	6.3	4.7	8.5	10.7	4.7	5.3	4.0	6.6	4.1	11.7
90TH %ILE	29	19	29	44	18	22	15	34	14	42
WATER QLTY	A	A	A	R	A	A	A	A	A	A
CLASSIFICATION	R	A	R	R	A	R	A	A	A	R

Station #	47	50	51	52	53					
SAMPLES	36	36	36	35	36					
GEOMEAN	24.2	11.9	5.5	8.9	15.8					
90TH %ILE	188	127	19	62	93					
WATER QLTY	R	R	A	R	R					
CLASSIFICATION	R	R	A	R	R					

A - Approved **CA** - Conditionally Approved **R** - Restricted
RND - Restricted/No Depuration **P** - Prohibited

TABLE #3

Water Quality
Sampling Stations Data

Shellfish Management Area 12B

BACTERIOLOGICAL DATA

Data for each shellfish station listed in this report's "Fecal Coliform Bacteriological Data Summary Table" and in other shellfish reports, can be obtained through South Carolina's Department of Health and Environmental Control - Freedom of Information office at the address below.

Freedom of Information
2600 Bull Street
Columbia, SC 29201

Any explanation or clarity needed on the report's content can be obtained by contacting the preparer(s), and/or reviewer(s) listed on the cover page.

TABLE #4

Rainfall Data

Shellfish Management Area 12B

SOURCE:
Rainfall information provided by
SC State Climatologist Office, Columbia, South Carolina.
Edisto Island (3-SW) Station (382730)

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: South Carolina State Climatology Office

Columbia, SC (Edisto Island - Station #382730 / 3-SW)

2000	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.16	0.00	0.00	0.00
2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.14	0.00	0.00	0.10
3rd	0.00	0.00	1.10	0.00	0.00	0.00	0.00	--	2.25	0.00	0.00	0.00
4th	0.00	0.00	0.02	0.00	0.00	0.38	0.00	0.12	1.27	0.06	0.01	0.00
5th	0.02	0.00	0.00	0.00	0.00	0.33	0.00	1.70	1.13	0.00	0.35	0.00
6th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.10	0.00
7th	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.02	0.00
8th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.60
10th	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
11th	0.00	0.00	0.05	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00
12th	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.32	0.00	0.00	0.00	0.00
13th	0.00	1.50	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.08	0.00
14th	0.00	0.47	0.00	0.53	0.00	0.00	--	0.24	0.00	0.00	0.00	0.10
15th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
16th	0.06	0.00	0.45	0.00	0.00	0.00	0.00	--	0.00	0.00	0.42	0.10
17th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.39	0.00
18th	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.10	0.00	0.73	0.00
19th	0.23	0.00	2.40	0.00	0.00	0.83	0.00	--	0.00	0.00	0.00	0.10
20th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00
21st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.02	0.00	0.00	0.00
22nd	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.25	0.35	0.00	0.00	0.00
23rd	0.25	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.38	0.00
24th	0.36	0.00	0.00	0.35	0.00	0.00	1.30	0.00	0.92	0.00	0.43	0.00
25th	0.02	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00
26th	0.00	0.10	0.00	0.00	0.14	0.00	--	0.27	0.00	0.00	0.00	0.00
27th	0.00	0.00	0.15	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.19
28th	0.47	0.00	0.00	0.00	0.51	0.10	--	0.00	0.00	0.00	0.00	1.17
29th	0.25	0.00	0.00	0.38	0.00	0.00	--	0.15	0.00	0.00	0.00	0.00
30th	0.43		0.26	0.00	0.00	0.00	1.95		0.00	0.00	0.00	0.00
31st	0.00		0.00		0.00		--			0.00		0.00
(Monthly Figures)							**Year's Rainfall Total:**				**33.80**	
SUM	2.43	2.07	4.43	1.26	0.65	1.64	4.03	3.32	8.61	0.06	2.91	2.39
MAX	0.47	1.50	2.40	0.53	0.51	0.83	1.95	1.70	2.25	0.06	0.73	1.17
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.08	0.07	0.14	0.04	0.02	0.05	0.17	0.15	0.29	0.00	0.10	0.08

Note:"--" denotes missing data

(Shellfish Management Areas 12A, 12B, 13)

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: South Carolina State Climatology Office

Columbia, SC (Edisto Island - Station #382730 / 3-SW)

2001	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.00	0.00	0.02	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00
2nd	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	1.61	0.00	0.00	0.00
3rd	0.00	0.10	0.36	0.00	0.00	0.73	--	0.00	0.62	0.00	0.00	0.00
4th	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.02	0.00	0.00	0.00
5th	0.00	0.00	0.00	0.00	0.00	0.00	--	0.12	0.25	0.00	0.00	0.00
6th	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.01	0.00	0.00
7th	0.05	0.00	0.00	0.00	0.03	0.71	--	0.00	0.00	0.00	0.00	0.00
8th	0.16	0.00	0.00	0.00	0.00	0.10	--	0.00	0.03	0.00	0.00	0.39
9th	0.00	0.00	0.00	0.00	0.00	0.25	--	0.05	0.00	0.00	0.00	0.00
10th	0.00	0.10	0.00	0.00	0.00	0.51	--	0.00	0.00	0.00	--	1.77
11th	0.12	0.53	0.00	0.00	0.00	0.10	--	0.00	0.00	0.00	0.00	0.00
12th	0.00	0.00	0.85	0.00	0.03	0.00	0.22	0.00	0.00	0.00	0.00	0.05
13th	0.00	0.00	0.00	0.10	0.00	--	0.15	0.43	0.35	0.00	0.00	0.10
14th	0.15	0.00	0.17	0.00	0.00	0.10	0.00	0.15	0.25	0.45	0.00	0.00
15th	0.00	0.00	0.62	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16th	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18th	0.10	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.00	0.00	0.00	0.00
19th	0.22	0.00	0.52	0.00	0.00	0.08	0.00	0.22	0.00	0.00	0.00	0.00
20th	0.00	0.00	1.20	0.00	0.00	0.20	2.00	1.78	0.25	0.00	0.00	0.00
21st	0.00	0.13	0.00	0.00	0.00	0.25	0.10	0.18	0.00	0.00	0.00	0.00
22nd	0.42	0.00	0.00	0.00	1.35	0.05	0.00	0.00	0.00	0.00	0.00	0.00
23rd	0.00	0.00	0.00	0.00	0.00	--	0.46	0.00	0.01	0.00	0.00	0.00
24th	0.00	0.00	0.05	0.00	0.00	0.00	0.06	0.00	0.65	0.00	0.34	0.00
25th	0.00	0.32	0.09	0.35	0.00	--	0.00	0.00	0.02	0.00	0.00	0.00
26th	0.00	0.00	0.00	0.00	0.50	--	0.00	0.00	0.00	0.00	0.00	0.00
27th	0.00	0.04	0.00	0.00	0.00	0.00	1.24	0.00	0.00	0.00	0.00	0.00
28th	0.00	0.00	0.22	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
29th	0.00		0.20	0.00	0.00	0.00	--	0.00	0.00	--	0.00	0.00
30th	0.13		0.00	0.00	0.00	0.00	1.15	--	0.00	0.00	0.00	0.00
31st	0.00		0.00		0.00		0.00	1.55		0.00		0.00
(Monthly Figures)							**Year's Rainfall Total:**				**31.08**	
SUM	1.35	1.39	4.30	0.57	1.91	3.08	5.58	5.73	4.06	0.46	0.34	2.31
MAX	0.42	0.53	1.20	0.35	1.35	0.73	2.00	1.78	1.61	0.45	0.34	1.77
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.04	0.05	0.14	0.02	0.06	0.12	0.29	0.19	0.14	0.02	0.01	0.07

Note:"--" denotes missing data

(Shellfish Management Areas 12A, 12B, 13)

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: South Carolina State Climatology Office

Columbia, SC (Edisto Island - Station #382730 / 3-SW)

2002	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.08	0.05	0.00	0.00	0.00
2nd	0.40	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00
3rd	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.00	--	0.10	0.00
5th	0.00	0.01	0.00	0.00	0.20	0.00	0.10	0.00	0.00	--	0.68	0.00
6th	0.00	1.25	0.00	0.00	0.00	0.00	0.15	0.17	0.00	0.00	0.00	0.00
7th	0.00	0.30	0.00	0.00	0.00	1.80	0.00	0.00	0.00	0.00	0.00	0.00
8th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.00
9th	0.00	0.13	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.12	1.23
10th	0.00	0.27	0.00	0.75	0.00	--	0.00	0.00	0.00	6.35	1.14	0.18
11th	0.50	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.20	0.70	0.00
12th	0.95	0.00	0.25	0.03	0.00	0.00	0.00	0.00	0.00	0.00	--	0.73
13th	0.00	0.00	0.00	0.00	0.06	--	0.70	0.00	0.00	0.00	1.12	0.34
14th	0.37	--	0.00	0.00	0.00	0.00	0.00	0.10	0.33	1.74	0.00	0.00
15th	0.00	0.10	0.00	0.00	0.00	0.10	0.00	0.00	1.03	0.10	0.00	0.00
16th	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.84	0.00
17th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00
18th	0.00	0.00	0.00	0.00	1.29	0.40	0.00	0.00	0.00	0.00	0.00	0.57
19th	0.07	0.00	--	0.00	0.37	--	0.00	0.00	0.00	0.00	0.00	0.11
20th	0.00	0.25	--	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.00
21st	0.00	0.00	0.42	0.00	0.00	0.95	0.00	0.00	0.00	0.09	0.00	0.00
22nd	0.00	0.10	0.00	0.00	0.00	1.90	0.50	0.00	0.28	0.00	0.00	0.00
23rd	0.15	0.00	0.00	0.00	0.00	0.82	0.20	0.00	0.02	0.02	0.00	0.00
24th	0.10	0.00	0.00	0.00	0.00	1.75	0.00	0.95	0.17	0.12	0.00	1.19
25th	0.22	0.00	0.00	0.00	0.00	1.35	0.00	1.75	1.77	0.00	0.00	0.00
26th	0.04	0.08	0.17	0.10	0.00	0.15	0.00	0.63	0.00	--	0.00	0.00
27th	0.00	0.00	0.00	--	0.00	0.00	0.00	0.80	0.00	0.00	0.00	0.00
28th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.00	0.00
29th	0.00		0.00	0.00	0.00	0.00	0.00	1.78	0.13	1.59	0.00	0.00
30th	0.00		0.00	0.00	0.00	0.00	0.00	1.05	0.00	0.00	0.00	0.00
31st	0.00		0.56		0.00		0.22	0.55		--		0.00
(Monthly Figures)							**Year's Rainfall Total:**				**58.35**	
SUM	2.80	2.49	3.71	1.13	1.92	9.88	2.25	9.66	4.68	10.78	4.70	4.35
MAX	0.95	1.25	1.75	0.75	1.29	1.90	0.70	1.78	1.77	6.35	1.14	1.23
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.09	0.09	0.13	0.04	0.06	0.37	0.07	0.31	0.16	0.40	0.17	0.14

Note:"--" denotes missing data

(Shellfish Management Areas 12A, 12B, 13)